Encom ModelVision Pro
Version 7.0 Release Notes

This release of Encom ModelVision Pro has many new features including joined polygons, FFT grid filters, colour table editor, IGRF utilities, and new conversion utilities, as well as many repairs and enhancements.

CD upgrade

A CD upgrade is available for users with current Support and Updates service subscriptions.

CD installation

To install ModelVision Pro 7.0 from CD, read the installation notes which can be found on the inside front cover of the CD.

Website download instructions

A complete installation of ModelVision Pro is shipping now and is available from the Encom website. Go to www.encom.com.au, select the Downloads option and from there select ModelVision Pro. The file size is approximately 55Mb.

The web download installation includes software, User Guide and Reference Manual files, tutorials and example data.

Once installation of the software is complete, ModelVision Pro 7.0 will require an update to your licensing. Please use the **File>Licence** option to access the Licence Manager. If you are upgrading ModelVision Pro from a previous operational version, you are granted 20 days to update the licence.

Note: The installation of ModelVision Pro 7.0 by default is installed into a folder called \ENCOM\MVIS_PRO 7.0. This means that the upgrade software will not overwrite any previous version of ModelVision Pro.

See Tutorial 9 in the ModelVision Pro distribution CD for details on how to use the new polygroup model.

Inversion is supported for polygroup bodies where points that are common to two adjacent polygons are moved jointly during the inversion.

Polygroup Body

This new body type allows you to create complex 3D models using grouped polygonal sections. It replaces the previous snap function and provides a fast, elegant way for managing complex earth models where you need to model the whole subsurface rather than the anomalous regions.
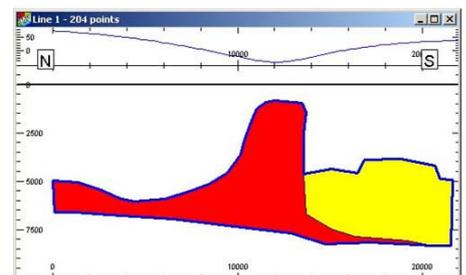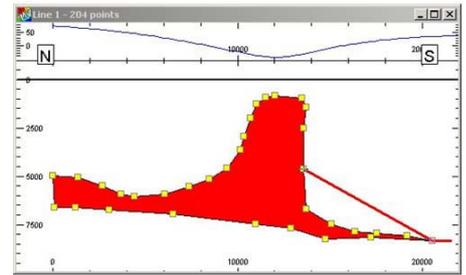
Major features include:
- Linked vertices to prevent overlap/gaps between adjacent bodies
- Links maintained during reshape, block shift and inversion of models
- Automatic digitising of new bodies to edges of existing bodies
- Bodies are grouped together in a section to form a polygroup
- All polygons in the polygroup have the same azimuth and strike length
- Links maintained during inversion of models
- Model full geological sections
- Model complex basement geology
- Model multiple mine cross-sections
- Detach individual bodies from polygroup if necessary

You start with a single polygon and attach new polygons using the new auto-snap function. This feature is easy to use, provides an audible feedback click with each snap and has an edge following capability that makes the creation of abutting polygons very fast. A right mouse click undoes the last point.

The polygroup body is created on a section and multiple sections can be used to allow for magnetic and density changes that are perpendicular to the line of section. This feature allows full 3D modelling of sedimentary basins over steeply dipping basement geology. You can see a ghost of the adjacent section on the current section for use as a reference when editing the current section.
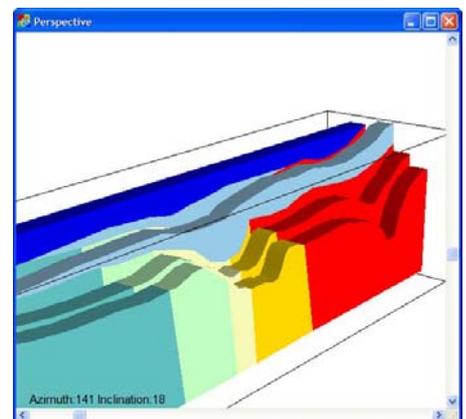
Example of complex basement geology using multiple sections

The example above illustrates how the shape of a basement magnetic model can be modified progressively from one section to the next. In a joint magnetic and gravity modeling exercise, you can add sedimentary sections above the basement surface and perform joint magnetic and gravity modelling. The model above is illustrative only but shows how you can combine polygons within a polygroup to build a true 3D sedimentary basin and basement model.

Petroleum Exploration Sections
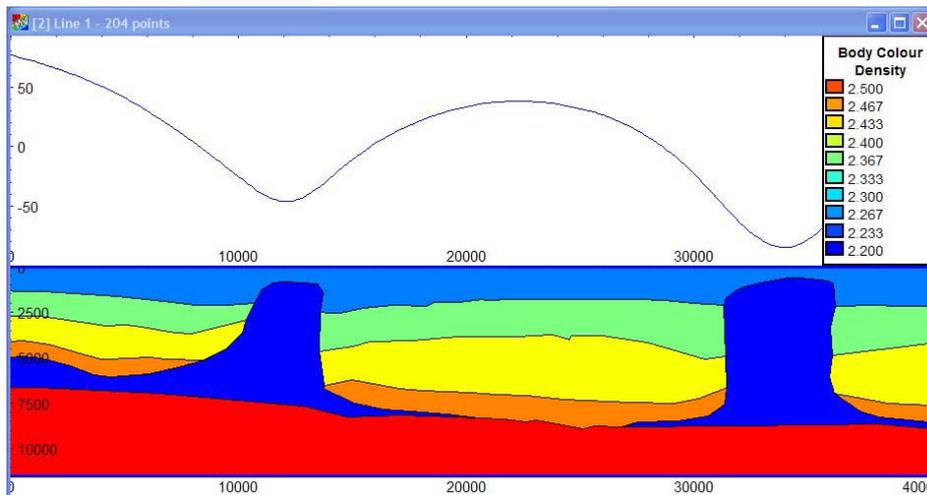
Gravity modelling and inversion of sedimentary sections is used widely in petroleum exploration. The new polygroup body now makes it much easier to build cross-sections and full 3D basin models. The example shown here illustrates the development of a complex layered model with two salt diapirs. The linking of adjacent layers makes it easy to connect to an existing layer without redrawing.

Assignment of lithology colours and properties makes it easy to apply appropriate colour shading techniques to the geological section.

The salt diapirs truncate the sedimentary layers and are linked to vertices on the layers. Salt diapirs can also be stratified to allow for vertical changes in density. By using multiple cross-sections, a true 3D response can be calculated for salt domes for precision matching against depth converted seismic sections.

Mine Plan Modelling

When geological sections are available from developing or production mining operations, they can be used as controls for development of magnetic and gravity models. Each section is modelled using the backdrop of the geological section as shown.
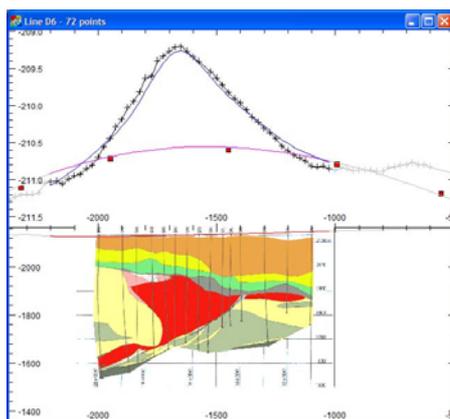
Geological section displayed in the cross-section view

By tracing the outline of each geological feature in the section, the cross-section can be fully modeled. In many cases it is not necessary to model every geological unit, only those with significant density or magnetic susceptibility contrast. The figure below shows a central cross-section that has been created directly from the located image of the mine section.
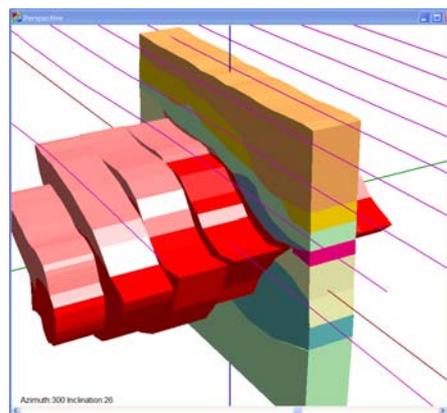
Example of the ModelVision Pro model developed from the detailed geological section

In this San Nicolas example, the mineralized zone has been modelled on adjacent lines to show how the deposit could extend beyond the control.

Once a control model has been developed, it is then possible to look for extensions beyond the limits of drilling. The initial process is focused on balancing the bulk properties using inversion after adjusting the regional field. When this process is complete, you can then look at unexplained anomalous components in the field data to see if possible extensions of the deposit exist beyond the drillhole control.

Once completed, the model can be exported to other packages in 3D DXF, GoCAD and UBC model formats.

Colour Lookup Tables (LUT)

You can now build your own colour lookup tables for images and body lithology using Encom's LUT Editor. This new tool can be used to create LUTs for ER Mapper, Oasis montaj™, ArcGIS, MapInfo and Profile Analyst.

This tool is used with the new lithology colour type for bodies that extends the existing unique colour and colour by property options.
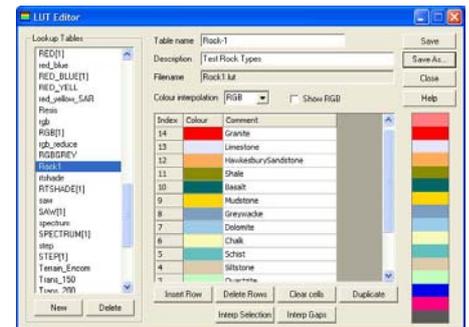
Lithology Colour Coding

Bodies can be assigned user-selected colours and names using a predefined lithology lookup table. The LUT Editor can be used to build your own lithology tables or you can edit those that are supplied with ModelVision Pro. The table is normally selected at the start of a project and used throughout the project.

You can assign lithologies such as basalt, diorite, sandstone, shale, siltstone etc.

The colour selector for bodies now supports more than 16 colours if required.

New Toolbar Buttons

You can now access the IGRF control, calculator and map lighting from the toolbar. The IGRF control sets the IGRF values for modelling and now it can create grids of IGRF values. The calculator is used for points, lines, drillholes and grids and because it is used extensively, we have added it to the toolbar buttons to make it easier to find. ModelVision Pro uses an illumination similar to 3D for models in map views, but this changes the colour saturation and can make it difficult to relate the bodies to the colour lookup table. This new button allows you to toggle lighting on and off.

FFT Line Filters

### Band Limited Noise Generator

This is a new FFT filter operating on line data. It allows the user to add noise with a uniform distribution and a specified standard deviation in a low pass bandwidth to an existing data channel. It is accessed from the **Filters>FFT Filters>Band Limited Noise Generator** menu item.

FFT Grid Filters

The research capabilities of ModelVision Pro have been extended with the introduction of a comprehensive range of 2D FFT filters that include the following:

• band pass
• high pass
• low pass
• x, y, z component transforms
• upward continuation
• downward continuation
• 1st, 2nd vertical derivative
• fractional derivatives
• x, y horizontal derivatives
• reduction to equator
• reduction to pole
• pseudo-gravity transform
• pseudo-magnetic transform

You can use these filters to transform TMI data for use with some of the enhanced inversion capabilities in ModelVision Pro such as inversion on the first vertical derivative. You can use the grid calculator to create the 2D analytic signal and tilt filters.
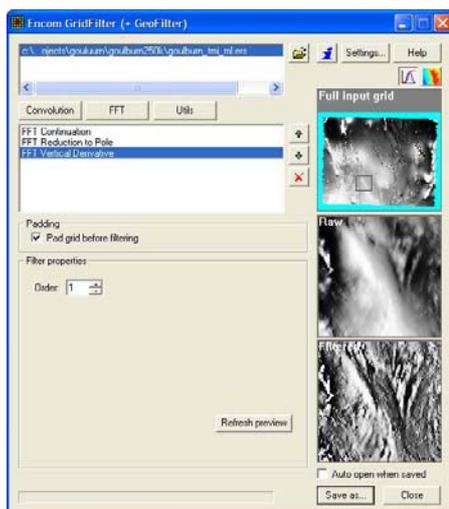
Example of cascaded upward continuation, reduction to pole and first vertical derivative filters.

DXF to TKM Converter

3D DXF files can be converted into TKM model files by the DXF2TKM plugin module. It is available within ModelVision Pro from the menu **Model>Import>DXF–3D**. This module will create a TKM file which will be loaded automatically into ModelVision Pro.
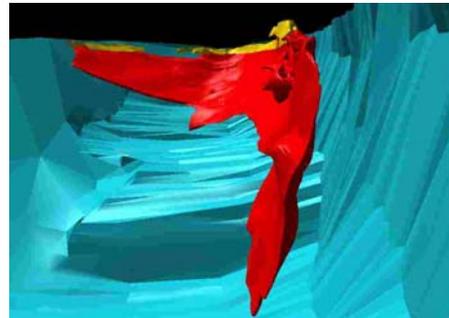

This powerful new capability allows you to introduce complex models from other products and simulate their magnetic and gravity responses.

IGRF Utilities

The existing IGRF Calculator is used for calculating the Earth's geomagnetic field at any point on a chosen map and for setting that as the inducing field for modelling.

There is now an IGRF grid creator available by clicking on the globe icon button on the toolbar and then the Grid Creator tab. This allows you to select an area specified by latitude and longitude limits and a grid interval to create grids channels of the Earth's geomagnetic field intensity, inclination and declination.

The area is initially set to the limits of the displayed map but you can drag out a rectangle to define a region within that map or edit the actual values to set them precisely. On clicking **OK**, new grids IGRFint, IGRFinc and IGRFdec will be created for the selected area. These grids can be displayed in a map view as an image or contours.
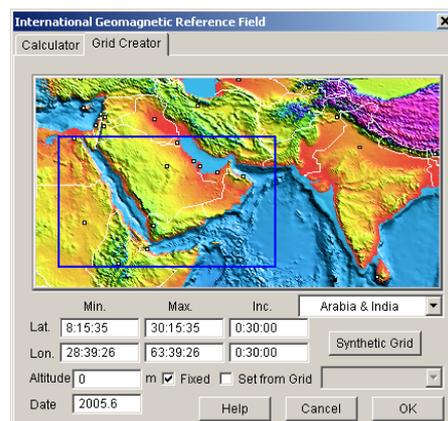
Creating IGRF grids for a selected region
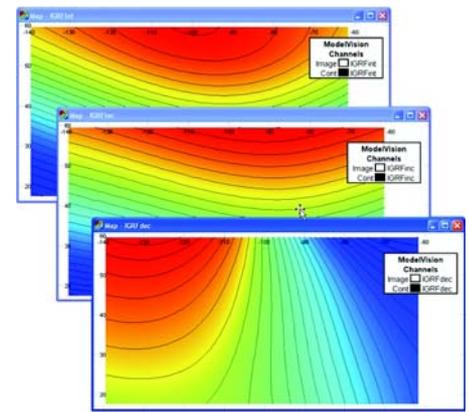
Alternatively, if you have a grid in memory specified in degrees latitude and longitude, this grid can be used as a template by ticking the 'Set from Grid' checkbox and selecting the required grid channel. For your convenience there is also a link button from this dialog to the Synthetic Grid creator.

The advantage of using an existing grid is that a grid of elevation values can be supplied, in which case you can clear the 'Fixed' checkbox and the IGRF values will be computed for the elevation of each individual grid station.

Multiple Body Editing

Editing of multiple bodies is controlled from the Body Properties Table and allows you to change certain properties of a contiguous sequence of bodies. If the required bodies are not contiguous their order in the table can be changed using the "U" or "D" keys on the keyboard.

Setting parameters for several bodies

Body Conversions

A range of body conversions is now available to increase the modelling flexibility. We find it useful to perform fast modelling with the tabular body and then convert it to a polygon or polyhedron for refinement of the shape. The body can also be sliced horizontally into a series of parallel slices that can be assigned individual properties. The table overleaf shows the range of conversions supported in version 7.0.

Bug fixes and improvements

- **Snap to vertex and Sync vertex buttons** have been removed from the toolbar to avoid confusion with the polygroup body. A new entry has been added to the mivision.ini file ([MISCELLANEOUS]SnapButtons). This defaults to 0 but can be set to 1,2 or 3 in order to display one or both buttons. The snap function can be used in the map view to join plunging prism models.

- **Picking bodies** has been improved for the difficult situations where bounding rectangles of bodies overlap.

- **Polyhedron computation problems** which occasionally occurred near singularities have been substantially reduced.

- **Nulls detection** has been improved reducing the generation of huge numbers which previously affected some computations, graphic displays and AutoMag.

- **Muddy images**
  Bugs in the histogram stretch and shadow enhancement algorithms have been corrected which solves the previously poor (muddy) representation of certain grids.

- **Match Average** computation mode has been disabled when multiple lines are selected. Previously this option resulted in different offsets being added to individual lines.

- **BMP And Profile Analyst EGB files**
  The current folder for these files is now added to their export file names so that you can more easily locate them.

- **Geosoft GDB line data**
  The import of this data has been changed from single to double precision.

- **Maximum entropy padding**
  The warning messages for padding of sparse data have been improved.

- **Large font settings** (120 dpi) on high resolution screens caused problems with the truncation of some dialogs. This occurred with the body property multi-tab dialog and map rectangle has been corrected.

- **Inversion of prism bodies**
  A problem restricting the inversion of prism bodies has been fixed.

- **Gridding**
  The default number of minimum curvature iterations in gridding has been changed from 10 to 100. For final grid production we recommend using 500 iterations and twice the line spacing in the expert setting to get the optimum results from your grids.

- **Mvision.ini**
  A problem with this configuration file occasionally disappearing has been fixed.

- **Synthetic line clipping**
  The inexact clipping of lines in the synthetic line generator has been corrected.

- **Regionals greater than 4th order were not stored in session files**
  The number of coefficients stored in a session file has been increased up to a 10th order polynomial.

Body Conversion Table

		New Body								
		Poly	Tab	Cyl	Ellipsoid	Sphere	P Prism	Frustum	Pipe	Polyhed.
Old Body	Polygon	1								1
	Tabular	1S	1S				1S	1S		1S
	Cylinder			1						1
	Ellipsoid				1					1
	Sphere				1	1				1
	P Prism						1S	1S		1S
	Frustum						1nt	1S		1
	Pipe						1nt	1S	1S	1
	Gen Polyhed.									1

Legend:

1 – Conversion enabled

S – Subdivision by layers enabled

nt – Taper of sides will be lost

Notes:

- Dipping top surface of a plunging prism is only retained for the top layer when a body is subdivided.

- When a tabular body is converted to a multi-slice polygon, slices are automatically placed in a polygroup body.

- When subdividing a new body into layers, variable properties can be assigned as a function of depth.

For more information

For more information about Encom ModelVision Pro, visit our website at www.encom.com.au, or talk to Encom to arrange a demonstration or request an evaluation copy of the software. To contact an authorised reseller in your region, visit www.encom.com.au/resellers

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